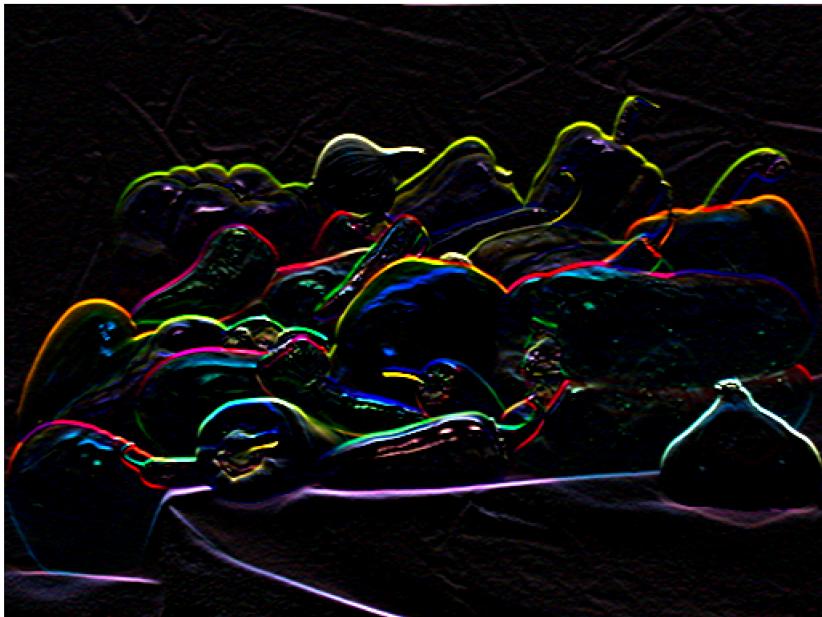


```
clear variables  
  
% a)  
im = imread('peppers.png');  
figure,imshow(im)
```



```
% b)  
h1 = [1 2 1; 0 0 0; -1 -2 -1];  
imf = imfilter(im, h1, 'conv', 'circular');  
figure,imshow(imf)
```



```
% c)
h2 = transpose(fspecial('prewitt'));
imf = imfilter(im, h2, 'conv', 'circular');
figure, imshow(imf)
```

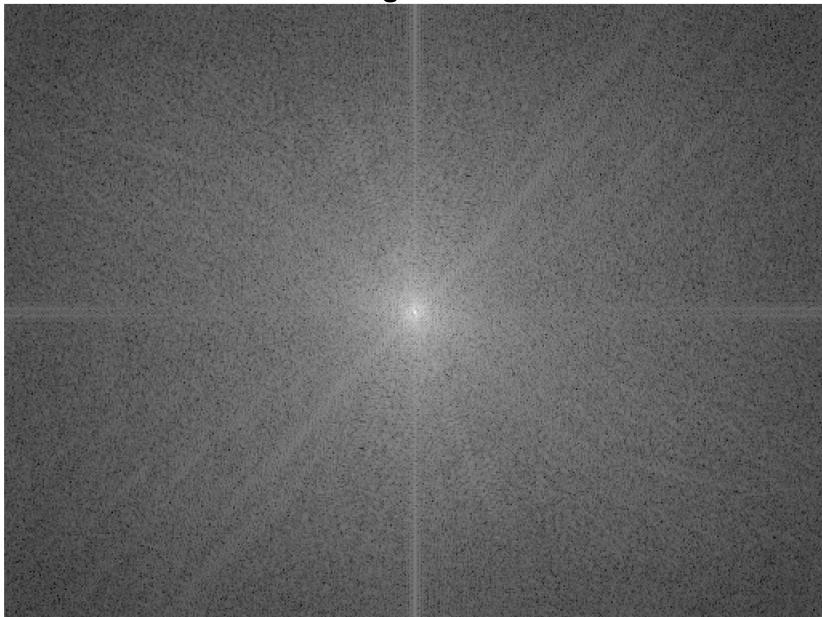


```
% d)
M = size(im,1); N = size(im,2);
[H1,f11,f21] = freqz2(h1,[M, N]);
[H2,f12,f22] = freqz2(h2,[M, N]);
% e)
if (ndims(im)==3)
    im = rgb2gray(im);
end
F = fftshift(fft2(double(im)));
figure, imshow(im);
```



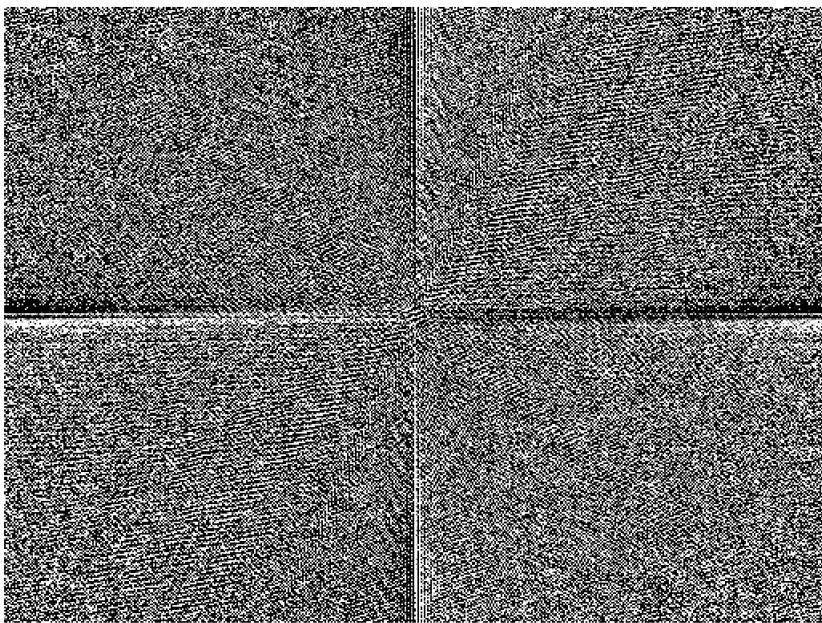
```
figure, imshow(log(abs(F)),[]); title('Magnitude')
```

Magnitude



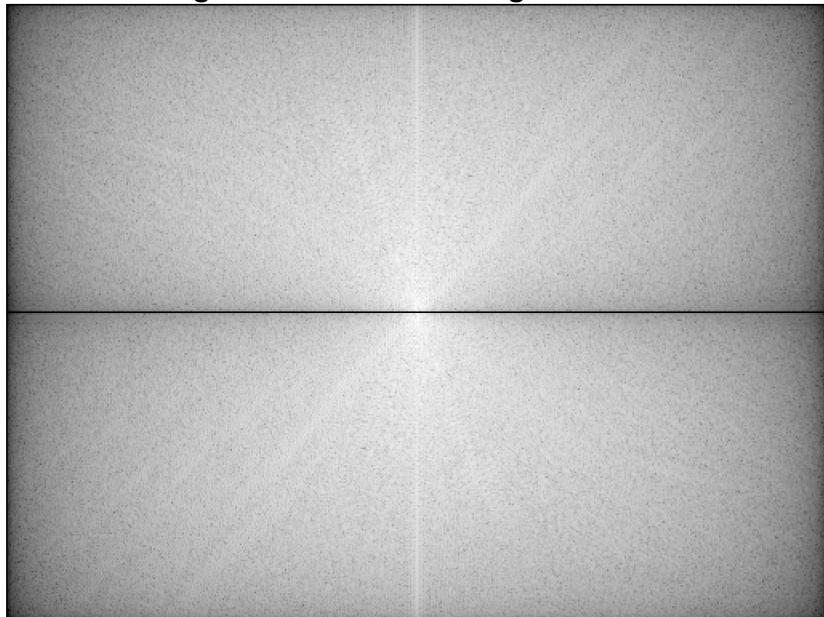
```
figure, imshow(angle(F)); title('Phase')
```

Phase



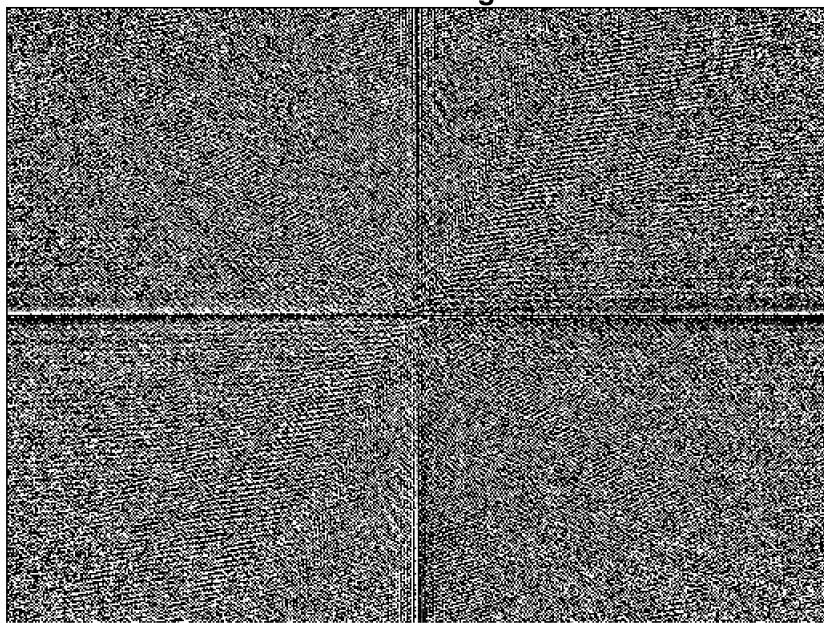
```
% f)  
G1 = H1.*F;  
figure, imshow(log(abs(G1)),[]); title('Magnitude - horizontal edge detection')
```

Magnitude - horizontal edge detection



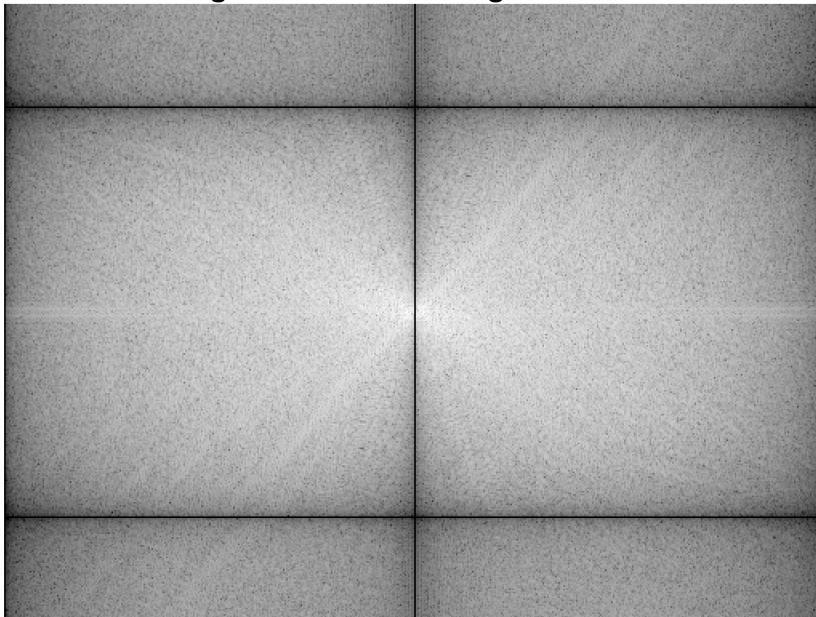
```
figure, imshow(angle(G1)); title('Phase - horizontal edge detection')
```

Phase - horizontal edge detection



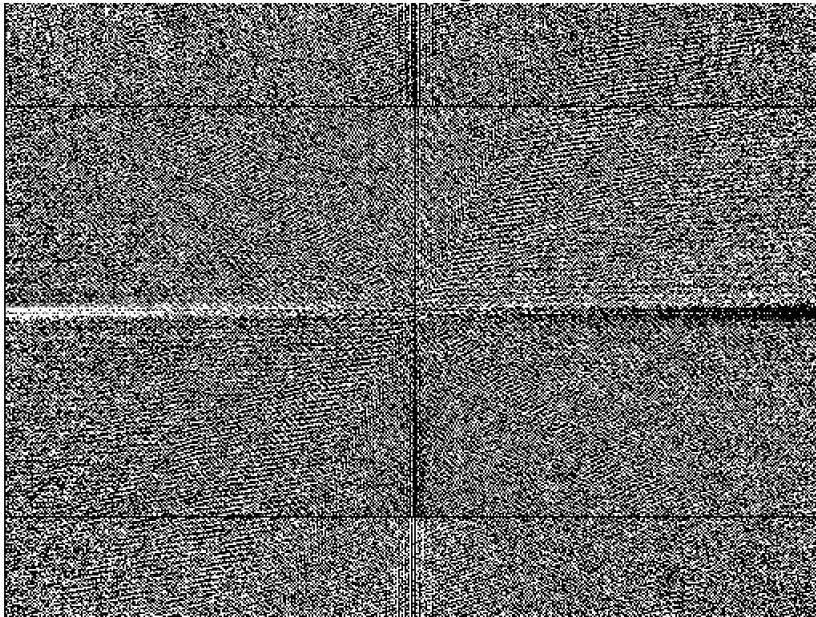
```
G2 = H2.*F;  
figure, imshow(log(abs(G2)),[]); title('Magnitude - vertical edge detection')
```

Magnitude - vertical edge detection



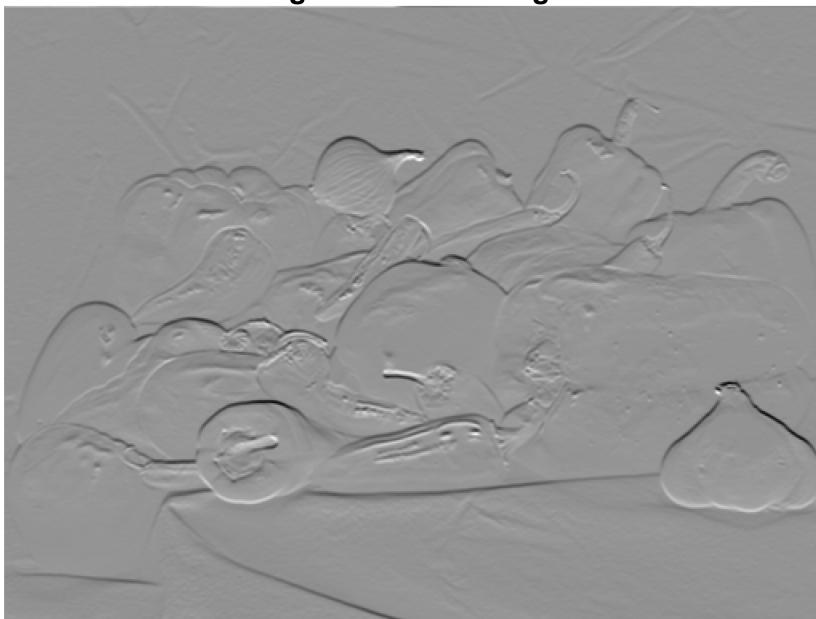
```
figure, imshow(angle(G2)); title('Phase - vertical edge detection')
```

Phase - vertical edge detection



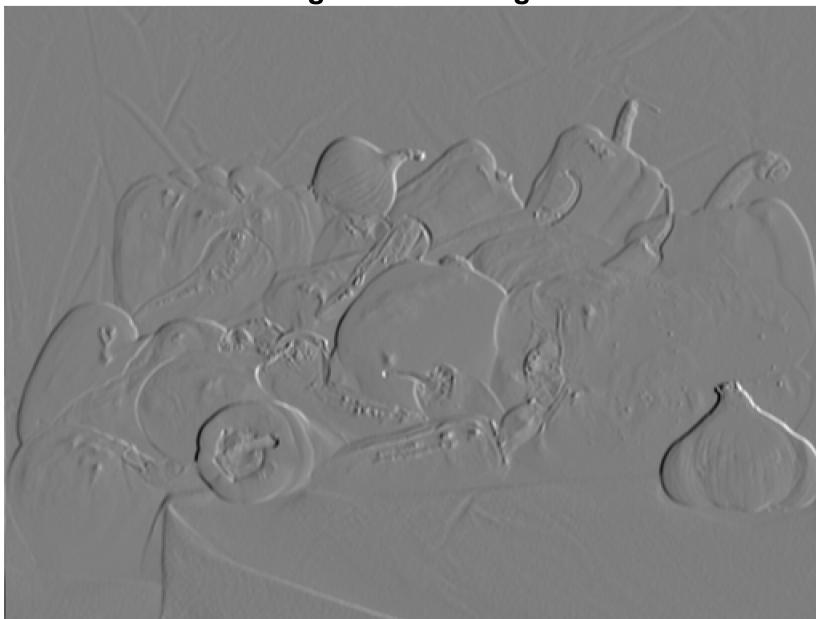
```
% g)  
imgf1 = real(fft2(ifftshift(double(G1))));  
figure, imshow(imgf1,[ ]); title('Filtered image - horizontal edge detection')
```

Filtered image - horizontal edge detection



```
imgf2 = real(ifft2(ifftshift(double(G2))));  
figure, imshow(imgf2,[ ]); title('Filtered image - vertical edge detection')
```

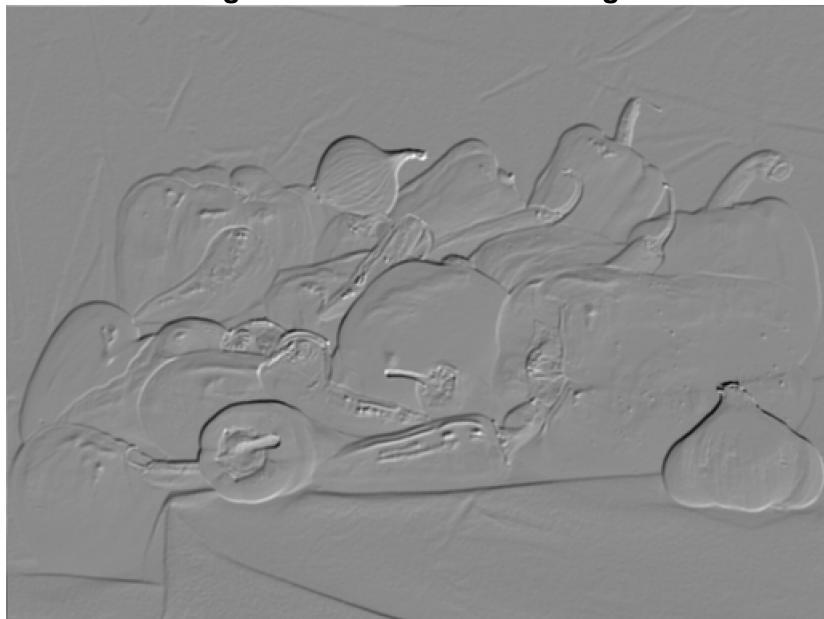
Filtered image - vertical edge detection



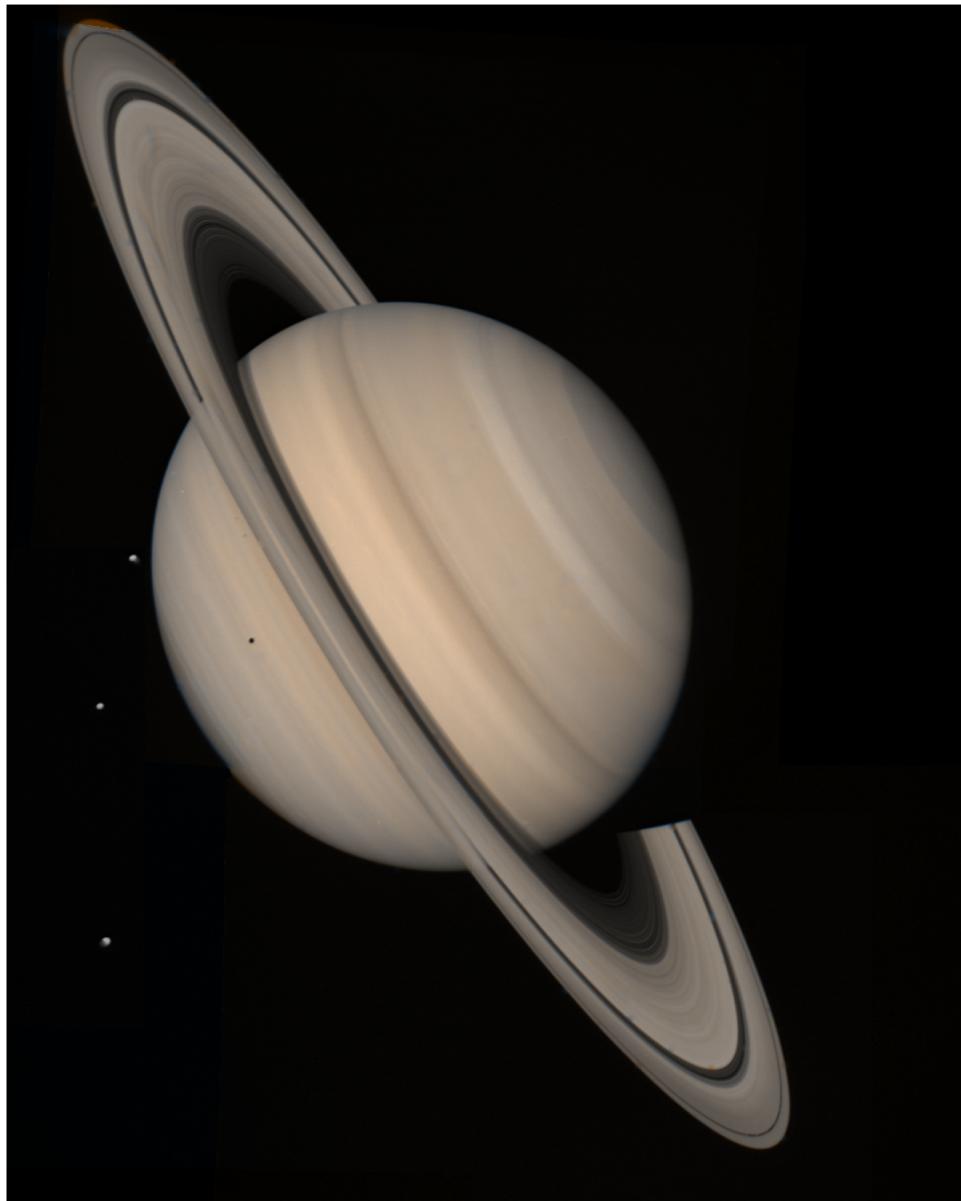
```
% h)  
imgf = (imgf1 + imgf2)/2;
```

```
% i)  
figure, imshow(imgf,[ ]); title('Filtered image - vertical + horizontal edge detection')
```

Filtered image - vertical + horizontal edge detection



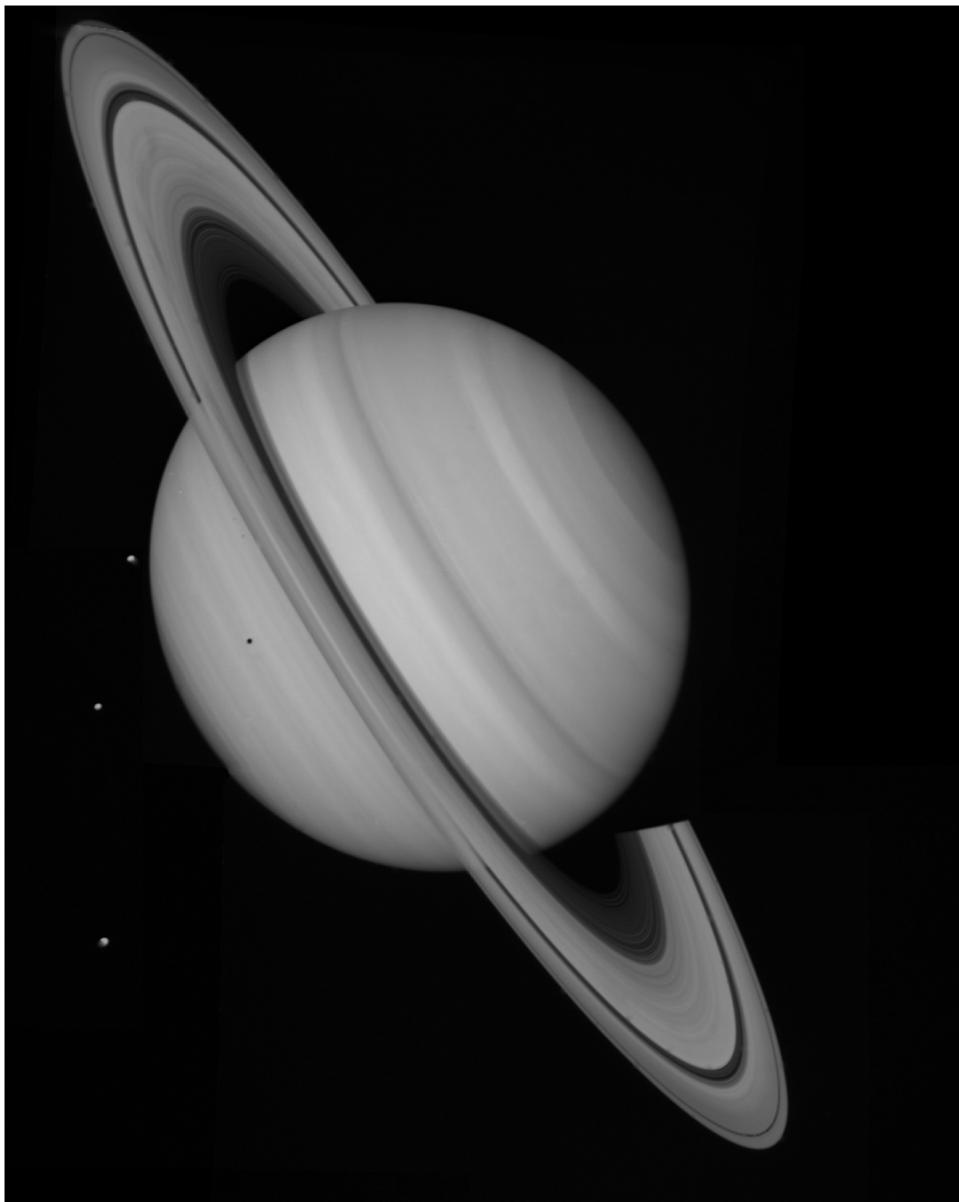
```
clear variables  
% a)  
saturn = imread('saturn.png');  
figure, imshow(saturn);
```



```
cameraman = imread('cameraman.tif');  
figure, imshow(cameraman);
```



```
% b)  
saturn = rgb2gray(saturn);  
figure, imshow(saturn);
```

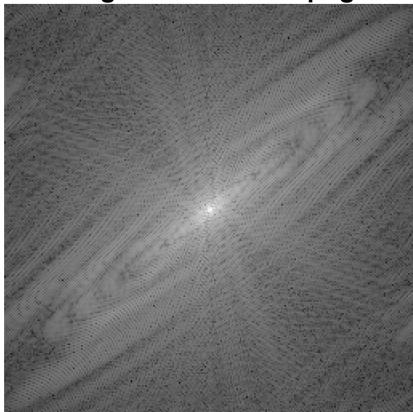


```
% c)
x = size(cameraman,1);
y = size(cameraman,2);
saturn = imresize(saturn,[x y]);
figure, imshow(saturn);
```



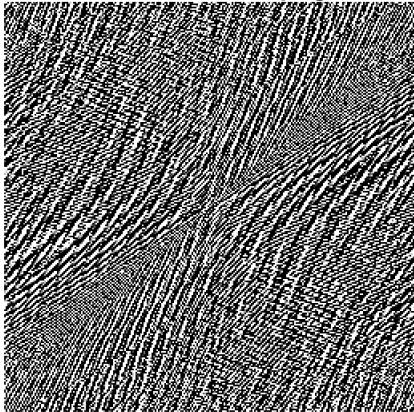
```
% d)
sat1 = fftshift(fft2(double(saturn)));
cam1 = fftshift(fft2(double(cameraman)));
% e)
mag_sat = log(abs(sat1));
pha_sat = angle(sat1);
figure, imshow(mag_sat,[]); title('Magnitude - saturn.png')
```

Magnitude - saturn.png



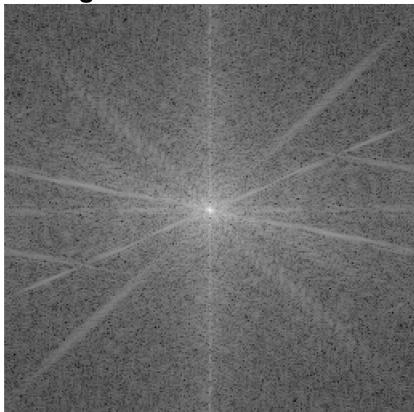
```
figure, imshow(pha_sat); title('Phase - saturn.png')
```

Phase - saturn.png



```
mag_cam = log(abs(cam1));
pha_cam = angle(cam1);
figure, imshow(mag_cam,[]); title('Magnitude - cameraman.tif')
```

Magnitude - cameraman.tif



```
figure, imshow(pha_cam); title('Phase - cameraman.tif')
```

Phase - cameraman.tif

